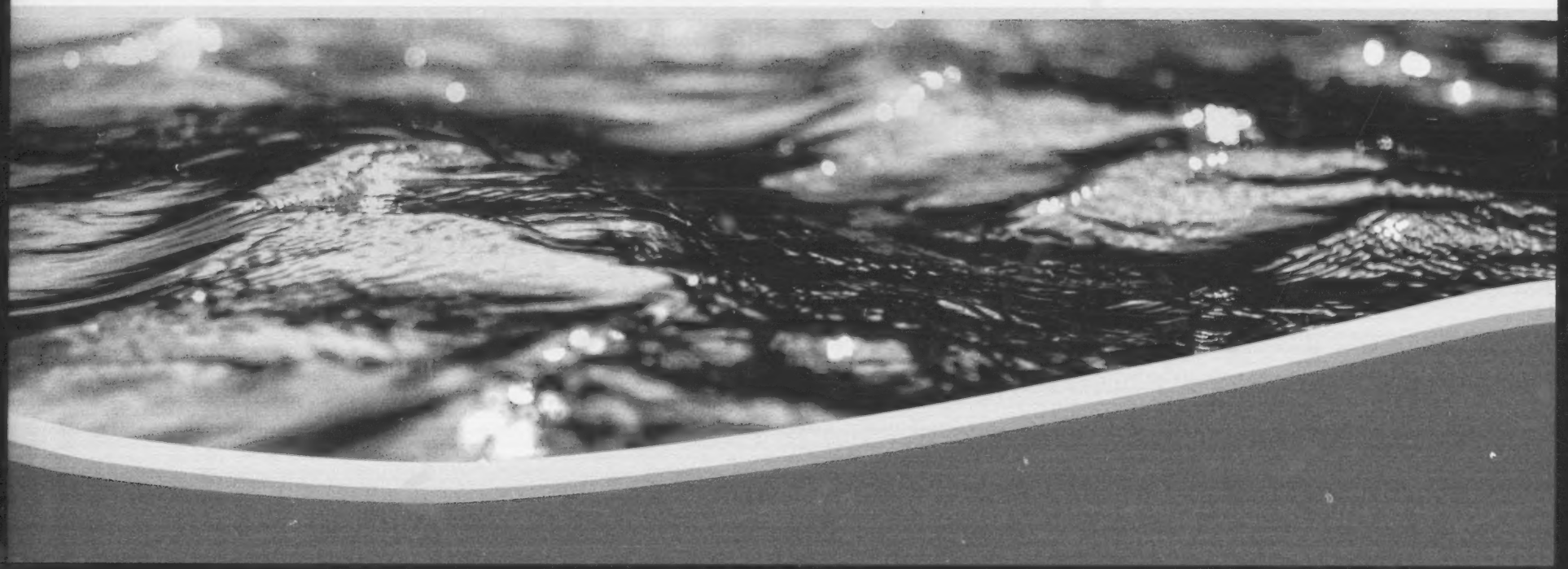
Quarterly Oil and Gas Water Management Summary

BC Oil & Gas COMMISSION

First Quarter 2016 (Jan - Mar)



PURPOSE

This *Quarterly Oil and Gas Water Use Summary* presents short-term water use and water licence data from the Q1 January to March 2016 period.

Previous annual water use reports and quarterly water use summaries are available on the BC Oil and Gas Commission website at www.bcogc.ca.

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Role of the

BC OIL AND GAS COMMISSION

The BC Oil and Gas Commission (Commission) is the provincial regulatory agency with responsibilities for regulating oil and gas activities in British Columbia, including exploration, development, pipeline transportation and reclamation.

The Commission's core services include reviewing and assessing applications for industry activity, consulting with First Nations, cooperating with partner agencies, and ensuring industry complies with provincial legislation and all regulatory requirements. The public interest is protected by ensuring public safety, respecting those affected by oil and gas activities, conserving the environment, and ensuring equitable participation in production.

The Commission is responsible for reviewing, assessing, and making decisions on water authorizations from both surface and subsurface water sources. The Commission has the expertise and tools to make informed water allocation decisions, and protecting and maintaining environmental and community water needs are its first priorities.

Commission Office Locations Throughout B.C.

HOW WATER IS USED

Water is used for various purposes in the oil and gas industry.

The largest use of water for oil and gas activities is for hydraulic fracturing.

However, water is used for other purposes, such as:

Seismic or geophysical exploration

Drilling

Machine washing

Dust control

Water floods (to enhance oil recovery)

Ice road freezing

Hydrostatic testing of pipelines

HOW WATER IS ACCESSED

There are different ways the oil and gas industry may access water in British Columbia. Some methods are managed through provincial legislation, including:

- **Water licences** issued under the Water Sustainability Act (WSA) for surface and groundwater. The Commission has staff designated as Regional Water Managers with authority for issuing and administering long-term water licences.
- **Short-term surface water use or diversion approvals** issued under Section 10 of the WSA. Short-term water use is administered by the Commission.
- **Water source wells** authorized by the Commission under the Oil and Gas Activities Act (OGAA). Water source wells are a specific type of well where the water withdrawn is intended for injection into an underground formation to enhance oil or natural gas recovery.
- **Flowback water** that returns to the surface after being injected for hydraulic fracturing.
- **Produced water** that flows to the surface as a by-product of oil and gas production.

The oil and gas industry can access water by means outside of regulatory oversight:

- **Private agreements** can be made with landowners or others who have a source of surface water supply such as a dugout or a groundwater well. In some cases, private agreements may require a Waterworks water licence under the WSA.

LONG-TERM WATER LICENCES AND USE

In the first quarter of 2016, there were 16 active oil and gas related water licences, representing 31 withdrawal locations, held by seven companies (Table 1).

The total annual licenced water volume was 15,548,135 m^3.

A total of 287,680 m^3 of licenced water was reported as withdrawn in the first three months of the year by four companies (Table 1, 2).

A break-down of water licence allocation and use by OGC Water Management Basin is listed in Table 4.

TABLE 1 - SUMMARY OF WATER LICENCE AND USE FOR OIL AND GAS ACTIVITIES FROM JANUARY TO MARCH 2016

		Q1
WATER LICENCE	Companies with Active Water Licences	7
	Active Water Licences	16
	Licenced Withdrawal Locations	31
	Annual Volume Available for Use for Water Licences (m^3)	15,548,135
	Cumulative Volume Reported Used in 2016 (m^3)	287,680

TABLE 2: OIL AND GAS RELATED WATER LICENCES THAT WITHDREW WATER IN 2016 - Q1

LICENCE #	LICENCEE	SOURCE	OGC WATER MANAGEMENT BASIN	ANNUAL APPROVAL (m^3/YR)	2016 WATER USE (m^3/YR)
C112155	Whitecap Resources	Peace River	Lower Peace River	1,825,000	118,363
C126568	Progress Energy Ltd.	Williston Lake	Peace Arm	3,650,000	11,991
C126877	Canadian Natural Resources Limited	Charlie Lake	Lower Beatton River	394,000	11,553
C127223	Canbriam Energy Inc.	Williston Lake	Peace Arm	3,650,000	54,052
C131230	Progress Energy Ltd.	Sikanni Chief River	Upper Sikanni Chief River	2,993,000	91,721

SHORT-TERM WATER APPROVAL AND USE

During January to March of 2016, there were a total of 162 short-term water use approvals in place, representing 753 withdrawal locations, held by 39 companies (Table 3).

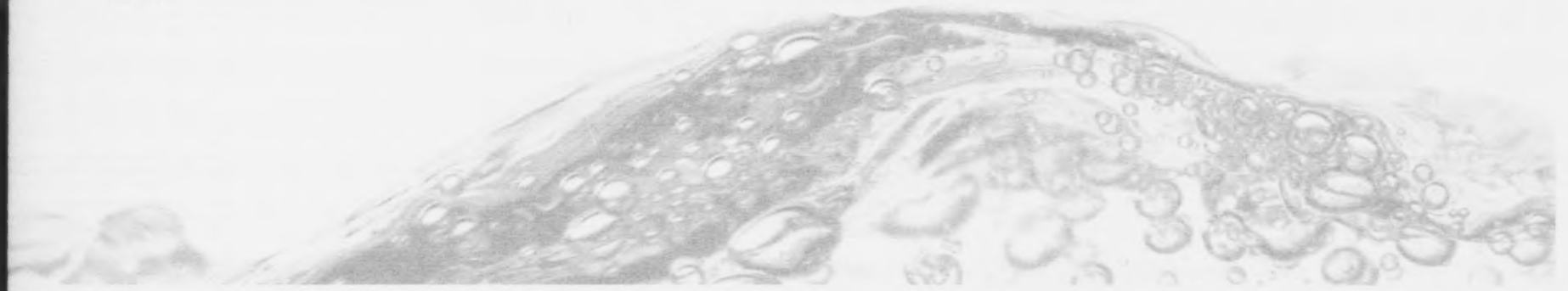
The total water volume associated with short-term approvals that were active on the last day of the quarter was 9,347,183 m^3.

A total of 269,564 m^3 was reported as withdrawn by oil and gas operators during the first quarter of 2016 (Table 3).

A break-down of short-term water approval and use by OGC Water Management Basin is listed in Table 4.

TABLE 3 - SUMMARY OF SHORT-TERM APPROVAL AND USE FOR OIL AND GAS ACTIVITIES FROM JANUARY TO MARCH 2016

		Q1
SHORT-TERM	Companies with Active Approvals	39
	Active Approvals	162
	Approved Withdrawal locations	753
	Volume Available for Use (m^3)	9,347,183
	Cumulative Volume Reported Withdrawn (m^3)	269,564



Introduction of the

WATER SUSTAINABILITY ACT

The Water Sustainability Act (WSA) came into effect on February 29, 2016, resulting in changes to surface water and groundwater allocation processes by the Commission. With the implementation of the WSA, the following regulations were created or revised and brought into force:

- Water Sustainability Regulation (replaces Water Regulation)
- Groundwater Protection Regulation (revised)
- Dam Safety Regulation (revised)
- Fees, Rentals and Charge Tariff Regulation (new)

The WSA modernizes the language of the Water Act and introduces a number of significant policy changes. Examples of key items that affect oil and gas activities include, but are not limited to:

- Water in a stream, and the percolation and flow of groundwater, are vested to the Crown.
- The regulatory scheme for the diversion and use of stream water is maintained and applied to both stream water and aquifer water.
- The rights of prior appropriation are retained – First In Time, First In Right (FITFIR).
- The consideration of the environmental flow needs of a stream in licensing decisions is mandated for all water allocation decisions related to streams, and to aquifers "reasonably likely" of being hydraulically connected to a stream.
- Explicit notification, objection and appeal rights for short-term water use approvals and changes in and about a stream are specified (appeals are to the Environmental Appeal Board).
- Deep groundwater is exempted from the requirement for a water licence.
- New powers are created to be applied when streams are at risk of falling or have fallen below their critical environmental flow thresholds, to modify the existing precedence of water use for the purpose of protecting the aquatic ecosystem of streams and aquifers and essential domestic uses (i.e., FITFIR can be overridden).
- Authority is provided to statutory decision makers to require environmental mitigation or offsetting when the diversion and use of water, or changes in and about a stream, are likely to have a significant adverse impact on the water quality, water quantity or aquatic ecosystem of a stream or aquifer.

As there are significant changes resulting from the implementation of the WSA, operators are strongly encouraged to review the document Water Sustainability Act Applications Support for Operators. This supplemental outlines material changes to application manuals,

processes and fees, short-term water use approvals, water licensing, and the aforementioned regulations.

The WSA and its regulations may be viewed online:

Water Sustainability Act

Water Sustainability Regulation

Water Sustainability Fees, Rentals and Charges Tariff Regulation

Groundwater Protection Regulation

Dam Safety Regulation

WATER LICENCE APPLICATIONS

Water Licence Application

New Water Licence Application - Surface Water

New Water Licence Application - Groundwater

Existing Use Groundwater licence application

Provide Additional Information

Provide Additional Information for your Application

Administration of Surface Water Rights

Licence Transfer of Ownership or Name Change

Abandonment / Amendments (Changes) to an existing Water Licence

Abandonment

Apportionment

Change of Purpose

Change of Works

Abandon Application

Abandon Your Application

Applications, abandonments, and amendments for water licences are now submitted through an online form at the following web address:

www.bcogc.ca/public-zone/water-information/water-licences

TABLE 4 - SUMMARY OF WATER ALLOCATION AND USE FOR OIL AND GAS ACTIVITIES IN 2016, ORGANIZED BY OGC WATER MANAGEMENT BASIN (Page 1 of 4)

MAJOR and Sub-Basin Name	SHORT-TERM WATER USE APPROVALS - BC OIL AND GAS COMMISSION					OIL AND GAS RELATED WATER LICENCES					
	NUMBER OF APPROVED WITHDRAWAL LOCATIONS	TOTAL VOLUME APPROVED (m^3) FOR LOCATIONS ACTIVE ON 3/31/2016	TOTAL VOLUME APPROVED as % of MEAN ANNUAL RUNOFF	TOTAL VOLUME WITHDRAWN IN 2016 (m^3)	TOTAL VOLUME WITHDRAWN AS % OF MEAN ANNUAL RUNOFF	NUMBER OF LICENCED WITHDRAWAL LOCATIONS	TOTAL VOLUME LICENCED (m^3)	TOTAL VOLUME LICENCED as % of MEAN ANNUAL RUNOFF	TOTAL VOLUME WITHDRAWN IN 2016 (m^3)	TOTAL VOLUME WITHDRAWN as % of MEAN ANNUAL RUNOFF	MEAN ANNUAL RUNOFF (m^3)
BEATTON RIVER (sub-basin of Peace River)											
Upper Beatton River	37	984,339	0.197%	33,986	0.007%	0					499,408,440
Middle Beatton River	25	195,437		10		0					249,152,995
Middle Beatton Total (incl. Upper Beatton)	**62**	**1,179,776**	**0.158%**	**33,996**	**0.005%**	**0**	**0**	**0.000%**			**748,561,435**
Milligan Creek	9	167,440	0.087%	0	0.000%	0					191,536,686
Blueberry River	27	432,677	0.148%	0	0.000%	0		0.000%			293,278,540
Doig River	1	3,000	0.001%	0	0.000%	0		0.000%			323,069,523
Lower Beatton River	0	0		0		1	394,000		11,553		138,262,629
BEATTON TOTAL	**99**	**1,782,893**	**0.105%**	**33,996**	**0.002%**	**1**	**394,000**	**0.023%**	**11,553**	**0.001%**	**1,694,708,813**
HALFWAY RIVER (sub-basin of Peace River)											
Chowade River	0					0					327,027,527
Upper Halfway River	6	202,550		590		0					795,962,409
Upper Halfway Total (includes Chowade)	**6**	**202,550**	**0.018%**	**590**	**0.000%**	**0**	**0**	**0.000%**			**1,122,989,936**
Graham River	5	306,300	0.036%	29,780	0.003%	0					860,627,172
Cameron River	35	967,037	0.432%	2,176	0.001%	0					223,679,567
Lower Halfway River	17	681,423		4,619		0					151,526,991
HALFWAY TOTAL	**63**	**2,157,310**	**0.091%**	**37,165**	**0.002%**	**0**	**0**	**0.000%**			**2,358,823,666**
MOBERLY RIVER (sub-basin of Peace River)											
Moberly River	0	0		0		0					391,714,995
MOBERLY TOTAL	**0**	**0**	**0.000%**	**0**	**0.000%**	**0**	**0**	**0.000%**			**391,714,995**
PINE RIVER (sub-basin of Peace River)											
Burnt River	1	10,000	0.001%	0	0.000%	0					737,930,022
Sukunka River	0	30,000		0		0					1,047,282,572
Sukunka River Total (includes Burnt)	**1**	**40,000**	**0.002%**	**0**	**0.000%**	**0**	**0**	**0.000%**			**1,785,212,594**
Upper Pine River	0	0	0.000%	0	0.000%	0					1,466,884,035
Murray River	7	36,096	0.001%	0	0.000%	7	25,000	0.001%	0	0.000%	2,698,285,017
Lower Pine River	31	1,146,026		2,794		0					137,619,889
PINE TOTAL	**39**	**1,222,122**	**0.019%**	**2,794**	**0.000%**	**7**	**25,000**	**0.000%**	**0**	**0.000%**	**6,088,001,535**

SUMMARY OF WATER ALLOCATION AND USE FOR OIL AND GAS ACTIVITIES IN 2016, ORGANIZED BY OGC WATER MANAGEMENT BASIN (Page 2 of 4)

MAJOR and Sub-Basin Name	SHORT-TERM WATER USE APPROVALS - BC OIL AND GAS COMMISSION					OIL AND GAS RELATED WATER LICENCES					
	NUMBER OF APPROVED WITHDRAWAL LOCATIONS	TOTAL VOLUME APPROVED (m^3) FOR LOCATIONS ACTIVE ON 3/31/2016	TOTAL VOLUME APPROVED as % of MEAN ANNUAL RUNOFF	TOTAL VOLUME WITHDRAWN IN 2016 (m^3)	TOTAL VOLUME WITHDRAWN AS % OF MEAN ANNUAL RUNOFF	NUMBER OF LICENCED WITHDRAWAL LOCATIONS	TOTAL VOLUME LICENCED (m^3)	TOTAL VOLUME LICENCED as % of MEAN ANNUAL RUNOFF	TOTAL VOLUME WITHDRAWN IN 2016 (m^3)	TOTAL VOLUME WITHDRAWN as % of MEAN ANNUAL RUNOFF	MEAN ANNUAL RUNOFF (m^3)
KISKATINAW RIVER (sub-basin of Peace River)											
West Kiskatinaw River	1	2,000	0.002%	0	0.000%	0					117,515,115
East Kiskatinaw River	6	8,800	0.008%	0	0.000%	0					105,452,962
Middle Kiskatinaw River	8	89,536		0		0					56,347,972
Middle Kiskatinaw Total (incl. West & East)	**15**	**100,336**	**0.036%**	**0**	**0.000%**	**0**	**0**	**0.000%**			**279,316,049**
Lower Kiskatinaw River	6	111,808		0	0.000%	1	400,000		0		89,659,847
KISKATINAW TOTAL	**21**	**212,144**	**0.057%**	**0**	**0.000%**	**1**	**400,000**	**0.108%**	**0**	**0.000%**	**368,975,896**
PEACE RIVER											
Peace Arm	0	22,000		0		2	7,300,000	N/A	145,773	N/A	N/A
Upper Peace River	1	60,000		0		0					36,423,413,429
Lynx Creek	0					0					30,436,635
Farrell Creek	7	160,706	0.177%	0	0.000%	0					91,018,843
Cache Creek	0	0	0.000%	0	0.000%	1	185,000	0.248%	0		74,603,546
Pouce Coupe River	1	115,000	0.045%	48,610	0.019%	1	2,000	0.001%	0		255,686,202
Lower Peace River	0	0		0		3	3,067,469		118,363		114,470,012
PEACE TOTAL (incl. Kisk/Pine/Moberly/Half/Beatton)	**231**	**5,732,175**	**0.012%**	**122,565**	**0.000%**	**16**	**11,373,469**	**0.024%**	**275,689**	**0.001%**	**47,891,853,572**
SMOKY RIVER											
Smoky River	30	77,700		0	0.000%	1	2,500	0.000%			2,669,506,123
SMOKY TOTAL	**30**	**77,700**	**0.003%**	**0**	**0.000%**	**1**	**2,500**	**0.000%**			**2,669,506,123**
MUSKWA RIVER (sub-basin of Fort Nelson River)											
Upper Muskwa River	0					0					1,725,201,511
Middle Muskwa River	0					0					1,973,711,816
Middle Muskwa Total (incl. Upper Muskwa)	**0**	**0**	**0.000%**	**0**	**0.000%**	**0**	**0**	**0.000%**			**3,698,913,327**
Lower Muskwa River	0	0				0					646,841,560
MUSKWA TOTAL	**0**	**0**	**0.000%**	**0**	**0.000%**	**0**	**0**	**0.000%**			**4,345,754,887**
PROPHET RIVER (sub-basin of Fort Nelson River)											
Upper Prophet River	7	67,190	0.005%	0	0.000%	0					1,470,271,289
Middle Prophet River	5	19,500		0		0					621,428,680
Middle Prophet Total (incl. Upper Prophet)	**12**	**86,690**	0.004%	**0**	**0.000%**	**0**	**0**	**0.000%**			**2,091,699,969**
Lower Prophet River	7	31,900		0		0					272,262,427
PROPHET TOTAL	**19**	**118,590**	**0.005%**	**0**	**0.000%**	**0**	**0**	**0.000%**			**2,363,962,396**

SUMMARY OF WATER ALLOCATION AND USE FOR OIL AND GAS ACTIVITIES IN 2016, ORGANIZED BY OGC WATER MANAGEMENT BASIN (Page 3 of 4)

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SIKANNI CHIEF RIVER (sub-basin of Fort Nelson River)											
Upper Sikanni Chief River	2	75,000	0.009%	0	0.000%	1	2,993,000	0.371%	11,991	0.001%	807,771,692
Middle Sikanni Chief River	35	255,380		2,935		0					949,755,794
Middle Sikanni Chief Total (incl. Upper Sikanni)	**37**	**330,380**	**0.019%**	**2,935**	**0.000%**	**1**	**2,993,000**	**0.170%**	**11,991**	**0.001%**	**1,757,527,486**
Lower Sikanni Chief	9	16,173		0		0					875,678,142
SIKANNI CHIEF TOTAL	**46**	**346,553**	**0.013%**	**2,935**	**0.000%**	**1**	**2,993,000**	**0.114%**	**11,991**	**0.000%**	**2,633,205,628**
FORT NELSON RIVER											
Kahntah River	15	43,700	0.011%	1,210	0.000%	0					400,582,903
Fontas River	3	450		0		0					591,531,903
Fontas Total (includes Kahntah)	**18**	**44,150**	**0.004%**	**1,210**	**0.000%**	**0**	**0**	**0.000%**	**0**	**0.000%**	**992,114,806**
Klua Creek	4	65,000	0.016%	0	0.000%	0					402,135,448
Upper Fort Nelson River	3	24,200		0		0					276,181,026
Upper Fort Nelson Total (incl. Sikanni Chief Total, Kahntah, Fontas, Klua)	**71**	**479,903**	**0.011%**	**4,145**	**0.000%**	**1**	**2,993,000**	**0.070%**	**11,991**	**0.000%**	**4,303,636,908**
Snake River	6	22,200	0.007%	0	0.000%	0					310,763,522
Sahtaneh River	18	125,200	0.026%	17,113	0.004%	2	40,000	0.008%	0	0.000%	474,904,729
Middle Fort Nelson River	9	47,825		4,534		0			0		515,348,901
Middle Ft Nelson Total (incl. Upper Ft. Nelson total, Muskwa Total, Prophet Total, Snake, Sahtaneh)	**123**	**793,718**	**0.006%**	**25,792**	**0.000%**	**3**	**3,033,000**	**0.025%**	**11,991**	**0.000%**	**12,314,371,343**
Kiwigana River	12	44,000	0.010%	0	0.000%	5	42,500	0.010%			441,657,543
Lower Fort Nelson River	20	127,292		0		0					312,768,938
FORT NELSON TOTAL	**155**	**965,010**	**0.007%**	**25,792**	**0.000%**	**8**	**3,075,500**	**0.024%**	**11,991**	**0.000%**	**13,068,797,824**
LIARD RIVER											
Muncho River	0					0					551,551,360
Upper Liard River	0					0					33,125,817,465
Upper Liard Total (incl. Muncho)	**0**	**0**	**0.000%**	**0**	**0.000%**	**0**	**0**	**0.000%**			**33,677,368,825**
Grayling River	0					0					630,833,914
Upper Toad River	0					0					1,521,055,576
Racing River	0					0					1,488,336,681
Lower Toad River	0					0					419,472,722
Beaver River	0					0					10,862,659,426
Middle Liard River	0					0					463,652,312

LIARD RIVER con't on next page

SUMMARY OF WATER ALLOCATION AND USE FOR OIL AND GAS ACTIVITIES IN 2016, ORGANIZED BY OGC WATER MANAGEMENT BASIN (Page 4 of 4)

MAJOR and Sub-Basin Name	SHORT-TERM WATER USE APPROVALS - BC OIL AND GAS COMMISSION					OIL AND GAS RELATED WATER LICENCES					
	NUMBER OF APPROVED WITHDRAWAL LOCATIONS	TOTAL VOLUME APPROVED (m^3) FOR LOCATIONS ACTIVE ON 3/31/2016	TOTAL VOLUME APPROVED as % of MEAN ANNUAL RUNOFF	TOTAL VOLUME WITHDRAWN IN 2016 (m^3)	TOTAL VOLUME WITHDRAWN AS % OF MEAN ANNUAL RUNOFF	NUMBER OF LICENCED WITHDRAWAL LOCATIONS	TOTAL VOLUME LICENCED (m^3)	TOTAL VOLUME LICENCED as % of MEAN ANNUAL RUNOFF	TOTAL VOLUME WITHDRAWN IN 2016 (m^3)	TOTAL VOLUME WITHDRAWN as % of MEAN ANNUAL RUNOFF	MEAN ANNUAL RUNOFF (m^3)
LIARD RIVER con't											
Middle Liard Total (incl. Upper Liard Total, Grayling, Upper Toad, Racing, Lower Toad, Beaver)	**0**	**0**	**0.000%**	**0**	**0.000%**	**0**	**0**	**0.000%**			**49,063,379,456**
Capot-Blanc Creek	23	481,715	0.262%	1,312	0.001%	0					183,879,851
Dunedin River	21	114,825	0.014%	0	0.000%	0					820,464,167
Lower Liard River	15	609,681		84,526		0					1,236,634,664
LIARD TOTAL (incl. Fort Nelson)	**214**	**2,171,231**	**0.003%**	**111,630**	**0.000%**	**8**	**3,075,500**	**0.005%**	**11,991**	**0.000%**	**64,373,155,962**
PETITOT RIVER											
Sahdoanah River	26	20,150	0.008%	2,780	0.001%	0					252,625,362
Upper Petitot River	68	91,438	0.006%	221	0.000%	0					1,476,579,488
Tsea River	26	55,900	0.013%	3,740	0.001%	2	20,000	0.005%	0	0.000%	434,062,484
Middle Petitot River	15	47,475		330		2	26,666				698,562,753
Middle Petitot Total (incl. Sahdoanah, Upper Petitot, Tsea)	**135**	**214,963**	**0.008%**	**7,071**	**0.000%**	**4**	**46,666**	**0.002%**	**0**	**0.000%**	**2,861,830,087**
Lower Petitot River	30	96,800		1,260		2	50,000				904,314,069
PETITOT TOTAL	**165**	**311,763**	**0.008%**	**8,331**	**0.000%**	**6**	**96,666**	**0.003%**	**0**	**0.000%**	**3,766,144,156**
HAY RIVER											
Upper Kotcho River	2	9,000	0.003%	0	0.000%	0					311,519,217
Kyklo River	7	32,200	0.022%	8,640	0.006%	0					145,897,691
Shekilie River	28	186,610	0.041%	392	0.000%	0					450,747,494
Lower Kotcho River	3	6,000		6,426		0					311,519,217
Lower Kotcho Total (includes Upper Kotcho, Kyklo, Shekilie)	**40**	**233,810**	**0.019%**	**15,458**	**0.001%**	**0**	**0**	**0.000%**			**1,219,683,619**
Hay River	29	191,200		11,580		0					538,672,352
HAY TOTAL	**69**	**425,010**	**0.024%**	**27,038**	**0.002%**	**0**	**0**	**0.000%**			**1,758,355,971**
CHINCHAGA RIVER											
Chinchaga River	1	61,000	0.056%	0	0.000%	0					109,492,680
CHINCHAGA TOTAL	**1**	**61,000**	**0.056%**	**0**	**0.000%**	**0**	**0**	**0.000%**			**109,492,680**
OTHER (outside Northeast B.C.)	**43**	**568,304**		**0**		**0**	**0**				N/A
GRAND TOTAL	**753**	**9,347,183**	**0.008%**	**269,564**	**0.000%**	**31**	**14,548,135**	**0.012%**	**287,680**	**0.000%**	**120,568,508,464**

Previous annual water reports and quarterly updates are available on the Commission's website at:
http://www.bcogc.ca/public-zone/water-information

For specific questions or enquiries regarding this data, please contact:

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